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TITLE: Method of driving color liquid crystal display panel and method of controlling display of timepiece

Abstract Text (1):
In a color liquid crystal display panel in which a liquid crystal layer is sealed in a gap between a first substrate formed with signal electrodes and a second substrate formed with data electrodes, portions where the signal electrodes cross over the data electrodes form pixel portions respectively, and color filters, in which filters of the three primary colors are alternately arranged at positions corresponding to the pixel portions, is provided, a normal color display of applying selection signals to all the signal electrodes in a time sharing manner and applying data signals to the data electrodes in correspondence with the selection signals applied to the respective signal electrodes; and a color reducing display of applying selection signals in such a manner to simultaneously select a plurality of the signal electrodes; are selectively performed, thereby reducing the power consumption of the color liquid crystal display panel.

Brief Summary Text (4):
As a method of driving a liquid crystal display panel including: signal electrodes provided on a first substrate; opposed electrodes provided on a second substrate; color filters provided on the first substrate or on the second substrate; and a liquid crystal layer sealed between the first substrate and the second substrate, and performing a color display by electro-optical change in the liquid crystal layer at pixel portions constituted of intersections of the signal electrodes and the opposed electrodes, a color display pattern signal of applying selection signals in a time sharing manner to all the signal electrodes which constitute the pixel portions of the liquid crystal display panel and applying data signals to the opposed electrodes in correspondence to the selection signals of the respective signal electrodes to thereby perform a display, is currently used in a small-sized information device.

Brief Summary Text (17):
A normal color display of applying selection signals to the plurality of signal electrodes constituting all the pixel portions of the color liquid crystal display panel in a time sharing manner, and applying data signals to the data electrodes in correspondence to the selection signals of the signal electrodes to allow the color filters of the pixel portions to be individually selected; and a color reducing display of applying selection signals in such a manner to simultaneously select a plurality of the signal electrodes to simultaneously select the filters of a plurality of the colors arranged at positions corresponding to the plurality of signal electrodes; are selectively performed.

Brief Summary Text (18):
Alternatively, a normal color display of applying selection signals to the plurality of signal electrodes constituting all the pixel portions of the color liquid crystal display panel in a time sharing manner, and applying data signals to the data electrodes in correspondence to the selection signals of the signal electrodes to allow the color filters of the pixel portions to be individually selected; and a limited color display of applying selection signals to part of the plurality of signal electrodes in a time sharing manner, and not applying selection signals to other signal electrodes to allow only the color filters arranged at positions corresponding to the signal electrodes to which the selection signals are applied to

be selected; are selectively performed.

Brief Summary Text (20):
Alternatively, it is suitable that selection signals are applied to part of the plurality of signal electrodes in a time sharing manner, and no selection signal is applied to other signal electrodes in the limited color display to allow only the filters, out of the color filters, in the form of stripes arranged to planarly overlap the signal electrodes respectively to which the selection signals are applied to be selected.

Brief Summary Text (21):
Further, in the present invention, when a display is performed on the liquid crystal display panel, a full color display of applying selection signals to the plurality of signal electrodes constituting all the pixel portions of the liquid crystal display panel in a time sharing manner, and applying data signals to the data electrodes in correspondence to the selection signals of the signal electrodes, and, further, at least one of the selection signal and data signal serving as a gradation signal for changing at many levels optical characteristics of the liquid crystal layer to allow the filters of three primary colors to be individually selected including gradations required for the full color display; and a reduced color display of reducing the number of levels of the gradation signal to be less than that of the full color display to allow the filters of three primary colors to be individually selected with the reduced gradation; are selectively performed.

Brief Summary Text (22):
In this event, it is suitable that a color reducing display of applying selection signals in such a manner to simultaneously select a plurality of the signal electrodes to simultaneously select the filters of a plurality of the colors arranged at positions corresponding to the plurality of signal electrodes, or a limited color display of applying selection signals to a part of the plurality of signal electrodes in a time sharing manner, and not applying selection signals to other signal electrodes to allow only the color filters arranged at positions corresponding to the signal electrodes to which the selection signals are applied to be selected, is also allowed to be selected.

Brief Summary Text (24):
A normal color display of applying selection signals to the plurality of signal electrodes constituting all the pixel portions of the color liquid crystal display panel in a time sharing manner, and applying data signals to the data electrodes in correspondence to the selection signals of the signal electrodes to allow the individual color filters of the pixel portions to be selected; and a color display of applying selection signals in such a manner to simultaneously select a plurality of the signal electrodes, and applying data signals to the plurality of data electrodes in a time sharing manner to allow the filters of a plurality of the colors in the form of stripes arranged to planarly overlap the plurality of data electrodes respectively to be individually selected and to reduce power consumption; are selectively performed.

Brief Summary Text (25):
Alternatively, a normal color display of applying selection signals to the plurality of the signal electrodes constituting all the pixel portions of the color liquid crystal display panel in a time sharing manner, and applying data signals to the data electrodes in correspondence to the selection signals of the signal electrodes to allow the filters of three primary colors in the form of stripes to be individually selected; and a black-and-white display of applying selection signals in such a manner to simultaneously select a plurality of the signal electrodes, and simultaneously applying the same data signals to three of the data electrodes on which the filters of three primary colors in the form of stripes are arranged to simultaneously select the filters of three primary colors to reduce power consumption; are selectively performed.

Detailed Description Text (26):
Selection signals and non-selection signals are also applied to the other signal electrodes in a similar time sharing manner, in which the selection signals are successively applied to the signal electrodes.

Detailed Description Text (34):
First, to the first signal electrode, a low power first selection signal 100 at Va voltage level is applied during a period corresponding to the first selection period 74, the second selection period 75 and the third selection period 76 in Tf1(+), and a low power first non-selection signal 101 at Ve voltage level is applied during the other periods in Tf1 (+). The same signals as those applied to the first signal electrode are also applied to the second signal electrode and the third signal electrode. Similarly to these three electrodes, low power selection signals at Va voltage level are integrally applied to every group of three out of the other signal electrodes in a time sharing manner during the selection periods. Since the signal electrodes are integrated in threes, the respective selection periods are three times those of the color display and the driving frequency of the selection signal is 1/3 that of the color display.

Detailed Description Text (35):
Also in Tf1 (-), low power second selection signals 102 at Vf voltage level are applied during the periods of the three electrodes, and low power second non-selection signals 103 at Vb voltage level are applied during the other periods. Similarly to these three electrodes, low power selection signals at Vf voltage level are integrally applied to every group of three out of the other signal electrodes in a time sharing manner during a period three times that of the conventional case.

Detailed Description Text (59):
Selection signals and non-selection signals are also applied to the other signal electrodes in a similar time sharing manner, in which the selection signals are successively applied to the signal electrodes.

Detailed Description Text (68):
First, to the first signal electrode, a low power third selection signal 120 at Va voltage level is applied during a period corresponding to the first selection period 74, the second selection period 75 and the third selection period 76 in Tf1(+), and during the other periods in Tf1(+), a low power third non-selection signal 121 at Ve voltage level is applied. The same signals as those applied to the first signal electrode are also applied to the second signal electrode and the third signal electrode. Similarly to these three electrodes, low power selection signals at Va voltage level are integrally applied to every group of three out of the other signal electrodes in a time sharing manner during the selection periods. Since the signal electrodes are integrated in threes, the respective selection periods are three times those of the full color display and the driving frequency of the selection signal is 1/3 thereof.

Detailed Description Text (69):
Also in Tf1 (-), low power fourth selection signals 122 at Vf voltage level are applied during the periods of the three electrodes, and low power fourth non-selection signals 123 at Vb voltage level are applied during the other periods. Similarly to these three electrodes, low power selection signals at Vf voltage level are integrally applied to every group of three out of the other signal electrodes in a time sharing manner during a period three times that of the conventional case.

Detailed Description Text (90):
As described above, the selection periods of the signal electrodes are successively delayed in a time sharing manner, and the periods other than the selection periods are non-selection periods.

Detailed Description Text (98):
As for the other signal electrodes, for example, low power selection signals, which are the same as those to the first and second signal electrodes, are applied to fourth and fifth signal electrodes respectively, and no selection signal is applied to a sixth signal electrode. In such a manner, low power selection signals are applied to two out of three signal electrodes in every group and not to the remaining one. The low power selection signals are, of course, applied in a time sharing manner.

Detailed Description Text (114):

To a first signal electrode, a low power eleventh selection signal 151 at V6 voltage level is applied during a period corresponding to a first selection period 74 and a second selection period 75 in Tf1(+), and a low power eleventh non-selection signal 152 at V2 voltage level is applied during the other periods in Tf1(+). The same signal as that applied to the first signal electrode is also applied to a second signal electrode. No selection signal is applied to a third signal electrode. As for the other signal electrodes, for example, low power selection signals are applied to fourth and fifth signal electrodes during the same periods, and no selection signal is applied to a sixth electrode. In such a manner, low power selection signals are applied to two out of three electrodes in every group and not to the remaining one. The low power selection signals are, of course, applied in a time sharing manner to every group of two signal electrodes.

Detailed Description Text (115):
A low power twelfth selection signal 153 at V1 voltage level is applied to the first signal electrode during a period corresponding to the first selection period and the second selection period in Tf1(-). A low power twelfth non-selection signal 154 at V5 voltage level is applied during the other periods in Tf1(-). A signal which is the same as that of the first signal electrode is also applied to the second signal electrode. No selection signal is applied to the third signal electrode. Selection signals of Tf1(-) are also applied to the other signal electrodes in the time sharing manner as in the case of Tf1(+)

Detailed Description Text (193):
In this embodiment, the dot matrix display portion 181 is controlled divided into an upper display region 212 and a lower display region 213 as shown in FIG. 21, and thus circuits are separately selected for these. However, the entire dot matrix display portion 181 may be controlled as one display region.

Detailed Description Text (201):
FIG. 21 shows display modes 215 to 218 for the dot matrix display portion 181. In 215, both the upper display region 212 and the lower display region 213 perform the full color display in 512 colors. In other words, this is a display by a maximum display ability of the liquid crystal display panel 20 of this timepiece with high power consumption of the liquid crystal display device.

Detailed Description Text (202):
In 216, the upper display region 212 performs the full color display, but the lower display region 213 performs the reduced color display in which the number of gradations is reduced using the reduced color display pattern signal to thereby reduce the number of colors to eight in order to reduce the power consumption.

Detailed Description Text (203):
In 217, the same color reducing display pattern signal is applied to every group of three signal electrodes and only the data electrode for one color out of three data electrodes for R, G, B in every group is used in the upper display region 212, thereby limiting the number of display colors to four. The same color reducing pattern signal is applied to every group of three signal electrodes and every group of three data electrodes, and further, gradation display is not performed, resulting in the black-and-white binary display in the lower display region 213, thereby efficiently reducing the power consumption. In this embodiment, the color filters are formed parallel to the data electrodes, and thus when the color reducing display pattern signal is used which simultaneously selects a plurality of the signal electrodes, the display is vertically stretched as compared with that of the full color display.

Detailed Description Text (204):
In 218, the same color reducing pattern signal is applied to every group of three signal electrodes and every group of three data electrodes, and further, gradation display is not performed, resulting in the black-and-white binary display gradation display in the upper display region 212 to thereby efficiently reduce the power consumption, and the limited color display pattern signal for driving two signal electrodes and stopping one is applied in the lower display region 213. Further, the color reducing display pattern signal is integrally used to thereby increase the size of a character, thereby decreasing influence which is exerted upon the

visibility due to the stop of driving of the signal electrodes.

Detailed Description Text (208):
The example in which the dot matrix display portion 181 is always controlled with divided into the upper display portion 212 and the lower display portion 213 is shown here, but it is also suitable to control it shifting its boundary line or dividing it into three or more regions in accordance with the circumstances.

Detailed Description Text (215):
Further, as a liquid crystal layer electro-optically changes by an effective voltage which is applied thereto during a fixed period, a plurality of the signal electrodes are simultaneously selected to reduce the number of time sharing, making it possible to reduce the voltages of the selection signal and the data signal according to a voltage averaging method. The reduction in the frequency and the reduction in the voltage enable reduction in the electric power consumed by the liquid crystal display device in both its driving circuit and liquid crystal layer. Additionally, the selection of the plurality of the selection signals results in the simultaneous selection of a plurality of color filters, enabling a bright display.

CLAIMS:

6. A method of driving a color liquid crystal display panel including: a transparent first substrate formed with a plurality of signal electrodes and a transparent second substrate formed with a plurality of data electrodes arranged so that a face formed with said signal electrodes and a face formed with said data electrodes are opposed to each other; a liquid crystal layer sealed in a gap therebetween; pixel portions respectively constituted at portions where said signal electrodes cross over and planarly overlap said data electrodes; and color filters, in which filters of three primary colors are alternately arranged at least at positions corresponding to said pixel portions, provided on said first substrate or on said second substrate, in which a display is performed by selectively applying a voltage between said signal electrodes and said opposed electrodes to thereby change optical characteristics of said liquid crystal layer between said signal electrodes and said opposed electrode at said pixel portion, wherein a normal color display of applying selection signals to said plurality of signal electrodes constituting all said pixel portions of said color liquid crystal display panel in a time sharing manner, and applying data signals to said data electrodes in correspondence to the selection signals applied to said signal electrodes to allow said color filters of said pixel portions to be individually selected; and a limited color display of applying selection signals to part of said plurality of signal electrodes in a time sharing manner, and not applying selection signals to other signal electrodes to allow only said color filters arranged at positions corresponding to said signal electrodes to which the selection signals are applied to be selected; are selectively performed.

7. The method of driving a color liquid crystal display panel according to claim 6, wherein said driven color liquid crystal display panel is a color liquid crystal display panel including color filters, in which filters of three primary colors in the form of stripes are alternately arranged to be parallel to and planarly overlap said signal electrodes, provided on said first substrate or on said second substrate, and selection signals are applied to part of said plurality of signal electrodes in a time sharing manner, and no selection signal is applied to other signal electrodes in said limited color display to allow only said filters out of said color filters, in the form of stripes, arranged to planarly overlap said signal electrodes respectively to which the selection signals are applied to be selected.

8. A method of driving a color liquid crystal display panel including: a transparent first substrate formed with a plurality of signal electrodes and a transparent second substrate formed with a plurality of data electrodes arranged so that a face formed with said signal electrodes and a face formed with said data electrodes are opposed to each other; a liquid crystal layer sealed in a gap therebetween; pixel portions respectively constituted at portions where said signal electrodes cross over and planarly overlap said data electrodes; and color filters, in which filters of three primary colors in the form of stripes are alternately arranged to be parallel to and planarly overlap said data electrodes, provided on said first substrate or on said second substrate, in which a display is performed by

selectively applying a voltage between said signal electrode and said opposed data electrodes to thereby change optical characteristics of said liquid crystal layer between said signal electrodes and said opposed data electrodes at said pixel portion, wherein a normal color display of applying selection signals to said plurality of signal electrodes constituting all said pixel portions of said color liquid crystal display panel in a time sharing manner, and applying data signals to said data electrodes in correspondence to the selection signals applied to said signal electrodes to allow said individual color filters of said pixel portions to be selected; and a color display of applying selection signals in such a manner to simultaneously select a plurality of said signal electrodes, and applying data signals to said plurality of data electrodes in a time sharing manner to allow said filters of a plurality of the colors in the form of stripes arranged to planarly overlap said plurality of data electrodes respectively to be individually selected and to reduce power consumption; are selectively performed.

9. A method of driving a color liquid crystal display panel including: a transparent first substrate formed with a plurality of signal electrodes and a transparent second substrate formed with a plurality of data electrodes arranged so that a face formed with said signal electrodes and a face formed with said data electrodes are opposed to each other; a liquid crystal layer sealed in a gap therebetween; pixel portions respectively constituted at portions where said signal electrodes cross over and planarly overlap said data electrodes; and color filters, in which filters of three primary colors in the form of stripes are alternately arranged to be parallel to and planarly overlap said data electrodes, provided on said first substrate or on said second substrate, in which a display is performed by selectively applying a voltage between said signal electrode and said opposed electrode to thereby change optical characteristics of said liquid crystal layer between said signal electrodes and said opposed data electrodes at said pixel portion, wherein a normal color display of applying selection signals to said plurality of signal electrodes constituting all said pixel portions of said color liquid crystal display panel in a time sharing manner, and applying data signals to said data electrodes in correspondence to the selection signals applied to said signal electrodes to allow said filters of three primary colors in the form of stripes to be individually selected; and a black-and-white display of applying selection signals in such a manner to simultaneously select a plurality of said signal electrodes, and simultaneously applying the same data signals to three of said data electrodes on which said filters of three primary colors in the form of stripes are arranged to simultaneously select said filters of three primary colors to reduce power consumption; are selectively performed.

10. A method of driving a color liquid crystal display panel including: a transparent first substrate formed with a plurality of signal electrodes and a transparent second substrate formed with a plurality of data electrodes arranged so that a face formed with said signal electrodes and a face formed with said data electrodes are opposed to each other; a liquid crystal layer sealed in a gap therebetween; pixel portions respectively constituted at portions where said signal electrodes cross over and planarly overlap said data electrodes; and color filters, in which filters of three primary colors are alternately arranged at least at positions corresponding to said pixel portions, provided on said first substrate or on said second substrate, in which a display is performed by selectively applying a voltage between said signal electrodes and said opposed data electrodes to thereby change optical characteristics of said liquid crystal layer between said signal electrode and said opposed data electrodes at said pixel portion, wherein a full color display of applying selection signals to said plurality of signal electrodes constituting all said pixel portions of said color liquid crystal display panel in a time sharing manner, and applying data signals to said data electrodes in correspondence to the selection signals applied to said signal electrodes, and, further, at least one of the selection signal and data signal serving as a gradation signal for changing optical characteristics of said liquid crystal layer at many levels to allow said filters of three primary colors to be individually selected including gradations required for said full color display; and a reduced color display of reducing the number of levels of the gradation signal to be less than that of said full color display to allow said filters of three primary colors to be individually selected with the reduced gradation; are selectively performed.

12. The method of driving a color liquid crystal display panel according to claim 11, wherein a limited color display of applying selection signals to part of said plurality of signal electrodes in a time sharing manner, and not applying selection signals to other signal electrodes to allow only said color filters arranged at positions corresponding to said signal electrodes to which the selection signals are applied to be selected, is also allowed to be selected.

13. The method of driving a color liquid crystal display panel according to claim 10, wherein a limited color display of applying selection signals to part of said plurality of signal electrodes in a time sharing manner, and not applying selection signals to other signal electrodes to allow only said color filters arranged at positions corresponding to said signal electrodes to which the selection signals are applied to be selected, is also allowed to be selected.

17. A method of controlling a display of a timepiece including a liquid crystal display panel for displaying a time or information related to a time, wherein said liquid crystal display panel is a color liquid crystal display panel including: a transparent first substrate formed with a plurality of signal electrodes and a transparent second substrate formed with a plurality of data electrodes arranged so that a face formed with said signal electrodes and a face formed with said data electrodes are opposed to each other; a liquid crystal layer sealed in a gap therebetween; pixel portions respectively constituted at portions where said signal electrodes cross over and planarly overlap said data electrodes; and color filters, in which filters of three primary colors are alternately arranged at least at positions corresponding to said pixel portions, provided on said first substrate or on said second substrate, and displaying said time or information related to a time by selectively applying a voltage between said signal electrodes and said opposed data electrodes to thereby change optical characteristics of said liquid crystal layer between said signal electrodes and said opposed data electrodes at said pixel portion, and a normal color display of applying selection signals to said plurality of signal electrodes constituting all said pixel portions of said color liquid crystal display panel in a time sharing manner, and applying data signals to said data electrodes in correspondence to the selection signals applied to said signal electrodes to allow said color filters of said pixel portions to be individually selected; and a color reducing display of applying selection signals in such a manner to simultaneously select a plurality of said signal electrodes to simultaneously select said filters of a plurality of the colors arranged at positions corresponding to said plurality of signal electrodes; are selectively performed.

23. A method of controlling a display of a timepiece including a liquid crystal display panel for displaying a time or information related to a time, wherein said liquid crystal display panel is a color liquid crystal display panel including: a transparent first substrate formed with a plurality of signal electrodes and a transparent second substrate formed with a plurality of data electrodes arranged so that a face formed with said signal electrodes and a face formed with said data electrodes are opposed to each other; a liquid crystal layer sealed in a gap therebetween; pixel portions respectively constituted at portions where said signal electrodes cross over and planarly overlap said data electrodes; and color filters, in which filters of three primary colors are alternately arranged at least at positions corresponding to said pixel portions, provided on said first substrate or on said second substrate, and displaying said time or information related to a time by selectively applying a voltage between said signal electrodes and said opposed data electrodes to thereby change optical characteristics of said liquid crystal layer between said signal electrodes and said opposed data electrodes at said pixel portion, and a normal color display of applying selection signals to said plurality of signal electrodes constituting all said pixel portions of said color liquid crystal display panel in a time sharing manner, and applying data signals to said data electrodes in correspondence to the selection signals applied to said signal electrodes to allow said color filters of said pixel portions to be individually selected; and a limited color display of applying selection signals to part of said plurality of signal electrodes in a time sharing manner, and not applying selection signals to other signal electrodes to allow only said color filters arranged at positions corresponding to said signal electrodes to which the selection signals are applied to be selected; are selectively performed.

24. The method of controlling a display of a timepiece according to claim 23, wherein said color liquid crystal display panel is a color liquid crystal display panel including color filters, in which filters of three primary colors in the form of stripes are alternately arranged to be parallel to and planarly overlap said signal electrodes, provided on said first substrate or on said second substrate, and selection signals are applied to part of said plurality of signal electrodes in a time sharing manner, and no selection signal is applied to other signal electrodes in said limited color display to allow only said filters, out of said color filters, in the form of stripes arranged to planarly overlap said signal electrodes respectively to which the selection signals are applied to be selected.

25. A method of controlling a display of a timepiece including a liquid crystal display panel for displaying a time or information related to a time, wherein said liquid crystal display panel is a color liquid crystal display panel including: a transparent first substrate formed with a plurality of signal electrodes and a transparent second substrate formed with a plurality of data electrodes arranged so that a face formed with said signal electrodes and a face formed with said data electrodes are opposed to each other; a liquid crystal layer sealed in a gap therebetween; pixel portions respectively constituted at portions where said signal electrodes cross over and planarly overlap said data electrodes; and color filters, in which filters of three primary colors in the form of stripes are alternately arranged to be parallel to and planarly overlap said data electrodes, provided on said first substrate or on said second substrate, and displaying said time or information related to a time by selectively applying a voltage between said signal electrodes and said opposed data electrodes to thereby change optical characteristics of said liquid crystal layer between said signal electrodes and said opposed data electrodes at said pixel portion, and a normal color display of applying selection signals to said plurality of signal electrodes constituting all said pixel portions of said color liquid crystal display panel in a time sharing manner, and applying data signals to said data electrodes in correspondence to the selection signals applied to said signal electrodes to allow said individual color filters of said pixel portions to be selected; and a color display of applying selection signals in such a manner to simultaneously select a plurality of said signal electrodes, and applying data signals to said plurality of data electrodes in a time sharing manner to allow said filters of a plurality of the colors in the form of stripes arranged to planarly overlap said plurality of data electrodes respectively to be individually selected and to reduce power consumption; are selectively performed.

26. A method of controlling a display of a timepiece including a liquid crystal display panel for displaying a time or information related to a time, wherein said liquid crystal display panel is a color liquid crystal display panel including: a transparent first substrate formed with a plurality of signal electrodes and a transparent second substrate formed with a plurality of data electrodes arranged so that a face formed with said signal electrodes and a face formed with said data electrodes are opposed to each other; a liquid crystal layer sealed in a gap therebetween; pixel portions respectively constituted at portions where said signal electrodes cross over and planarly overlap said data electrodes; and color filters, in which filters of three primary colors in the form of stripes are alternately arranged to be parallel to and planarly overlap said data electrodes, provided on said first substrate or on said second substrate, and displaying said time or information related to a time by selectively applying a voltage between said signal electrodes and said opposed data electrodes to thereby change optical characteristics of said liquid crystal layer between said signal electrodes and said opposed data electrodes at said pixel portion, and a normal color display of applying selection signals to said plurality of signal electrodes constituting all said pixel portions of said color liquid crystal display panel in a time sharing manner, and applying data signals to said data electrodes in correspondence to the selection signals applied to said signal electrodes to allow said filters of three primary colors in the form of stripes to be individually selected; and a black-and-white display of applying selection signals in such a manner to simultaneously select a plurality of said signal electrodes, and simultaneously applying the same data signals to three of said data electrodes on which said filters of three primary colors in the form of stripes are arranged to

simultaneously select said filters of three primary colors to reduce power consumption; are selectively performed.

27. A method of controlling a display of a timepiece including a liquid crystal display panel for displaying a time or information related to a time, wherein said liquid crystal display panel is a color liquid crystal display panel including: a transparent first substrate formed with a plurality of signal electrodes and a transparent second substrate formed with a plurality of data electrodes arranged so that a face formed with said signal electrodes and a face formed with said data electrodes are opposed to each other; a liquid crystal layer sealed in a gap therebetween; pixel portions respectively constituted at portions where said signal electrodes cross over and planarly overlap said data electrodes; and color filters, in which filters of three primary colors are alternately arranged at least at positions corresponding to said pixel portions, provided on said first substrate or on said second substrate, and displaying said time or information related to a time by selectively applying a voltage between said signal electrodes and said opposed data electrodes to thereby change optical characteristics of said liquid crystal layer between said signal electrodes and said opposed data electrodes at said pixel portion, and a full color display of applying selection signals to said plurality of signal electrodes constituting all said pixel portions of said color liquid crystal display panel in a time sharing manner, and applying data signals to said data electrodes in correspondence to the selection signals applied to said signal electrodes, and, further, at least one of the selection signal and data signal serving as a gradation signal for changing optical characteristics of said liquid crystal layer at many levels to allow said filters of three primary colors to be individually selected including gradations required for said full color display; and a reduced color display of reducing the number of levels of the gradation signal to be less than that of said full color display to allow said filters of three primary colors to be individually selected in with the reduced gradation; are selectively performed.

29. The method of controlling a display of a timepiece according to claim 28, wherein a limited color display of applying selection signals to part of said plurality of signal electrodes in a time sharing manner, and not applying selection signals to other signal electrodes to allow only said color filters arranged at positions corresponding to said signal electrodes to which the selection signals are applied to be selected, is also allowed to be selected.

30. The method of controlling a display of a timepiece according to claim 27, wherein a limited color display of applying selection signals to part of said plurality of signal electrodes in a time sharing manner, and not applying selection signals to other signal electrodes to allow only said color filters arranged at positions corresponding to said signal electrodes to which the selection signals are applied to be selected, is also allowed to be selected.